



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/811,063	03/16/2001	Joe A. Harrison	INTL-0519-US (P10729)	7275
21906	7590	06/29/2004	EXAMINER	
TROP PRUNER & HU, PC 8554 KATY FREEWAY SUITE 100 HOUSTON, TX 77024			TRAN, THANH Y	
			ART UNIT	PAPER NUMBER
			2827	

DATE MAILED: 06/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/811,063	<b>Applicant(s)</b> JOE A. HARRISON <i>AK</i>	
	<b>Examiner</b> Thanh Y. Tran	<b>Art Unit</b> 2827	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 April 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6,8-30,35-37 and 39-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-5,42 and 43 is/are allowed.
- 6) ☒ Claim(s) 6,8-30,35-37,39-41 and 44-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 8 recites the limitation "the mechanism" in line 1. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 6, 8-14, 25-30, 35-37 and 44-48 are rejected under 35 U.S.C. 102(e) as being anticipated by Boutros et al (U.S. 6,276,943).

As to claim 6, Boutros et al (U.S. 6,276,943) discloses in figures 1-5 a circuit board (3) comprising: circuitry (28); and a substrate (27) supporting the circuitry and having a contact edge to be inserted into a slot (14) of a slot connector housing assembly (1), the substrate (27) having an edge profile (32) engaged by the connector housing assembly (1) inside the slot (see element 14) in response to the substrate (27) being inserted into the slot (see element 14) to resist removal of the circuit board (3) from the slot connector housing assembly (1) (see Figs. 1-5, col. 4, line 24 - col. 6, line 7).

Art Unit: 2827

As to claims 8, 13, 26, 27, 29, 30 and 37, Boutros et al (U.S. 6,276,943) discloses in figures 1-5 a circuit board (3) and a corresponding method, wherein the mechanism (18) comprises at least one of a spring (11) located entirely inside the slot and a plastic latch (see latch 16) internal to slot (see col. 4, lines 25-33 and col. 5, line 56). It should be noted that: since the housing member/assembly 1 is made of plastic, the latch portion 18 is thus made of plastic.

As to claim 9, Boutros et al (U.S. 6,276,943) discloses in figures 1-5 a circuit board (3), wherein the profile comprises a notch (see the notch of circuit board as indicated at 32) formed in another edge of the substrate (27).

As to claim 10, figure 1 of Boutros et al shows that the another edge extends in an orthogonal direction to the edge inserted in the slot connector housing (1).

As to claim 11, Boutros et al (U.S. 6,276,943) discloses in figures 1-5 a circuit board (3) and a corresponding method comprising: supporting circuitry (28) on a substrate (27) to form a circuit board (3), the circuit board (3) having a contact edge comprising electrical contacts (29); and forming an edge profile (32) in the substrate (27) to engage a slot connector housing assembly (1) inside a slot (see element 14) of the slot connector housing assembly (1) in response to the substrate (27) being inserted into the slot (see element 14) to resist removal of the circuit board (3) from the slot connector housing assembly (1), the slot (see element 14) adapted to receive the contact edge (see Figs. 1-5, col. 4, line 24 - col. 6, line 7).

As to claim 12, and 36, Boutros et al discloses in figures 1-5 a circuit board (3) and a corresponding method, further comprising: engaging the profile (as indicated at 32)

Art Unit: 2827

with a mechanism (comprising elements 2, 18) located inside the slot connector housing (1) (see Figs. 1-5, col. 4, line 24 - col. 6, line 7).

As to claim 14, figure 1 of Boutros et al further discloses the step of: forming electrical contacts (29) on a first edge of the substrate (27) to circuit board (3); and forming the profile (32) on a second edge of the substrate (27), the second edge extending in a direction substantially orthogonal to a direction along which the first edge extends.

As to claims 25 and 28, Boutros et al discloses in figures 1-5 a slot connector and a corresponding method, comprising: a housing (1) including a slot (see element 14) to receive a circuit board (3); electrical contacts (11) to establish electrical communication with electrical contacts (29) of the circuit board (3); and a retention mechanism (18) to engage a profile (32) of the circuit board (3) to secure the circuit board (3) to the slot connector (see Figs. 1-5, col. 4, line 24 - col. 6, line 7).

As to claim 35, Boutros et al discloses in figures 1-5 a circuit board (3) and a corresponding method comprising: supporting circuitry (28) on a substrate (27) to form a circuit board (3); forming an electrical contact edge on the substrate (27), the electrical contact edge to be inserted into a slot (see element 14) of a slot connector housing assembly (1); and forming an edge profile (32) in the substrate (27) to engage the slot connector housing assembly (1) inside a slot (see element 14) in response to the substrate (27) being inserted into the slot (see element 14) to resist removal of the circuit board (3) from the slot connector housing assembly (1), wherein the profile (as indicated at 32) comprises a notch formed in another edge of the substrate (27) (see Figs. 1-5, col. 4, line 24 - col. 6, line 7).

Art Unit: 2827

As to claims 44, 45 and 48, Boutros et al discloses in figures 1-5 an apparatus, wherein the circuit board (3) is inserted in a first direction into the slot (see element 14) and the edge profile (32) engages the connector housing assembly (1) without substantial movement of the circuit board (3) in a second direction orthogonal to the first direction.

As to claims 46 and 47, Boutros et al discloses in figures 1-5 an apparatus, wherein the circuit board (3) is inserted in a first direction into the slot (see element 14) and the edge profile (32) engages the retention mechanism (18) without substantial movement of the circuit board in a second direction orthogonal to the first direction (see Figs. 1-5, col. 4, line 24 - col. 6, line 7).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 15-16 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boutros et al (U.S. 6,276,943) in view of Pope et al (U.S. 6,135,781).

As to claims 15 and 18, Boutros et al discloses in figures 1-5 a connector comprising: a housing (1) including a slot (see element 14) to receive a circuit board (3); and electrical contacts (11) secured to the housing (1) to establish electrical communication with electrical contact pads (29) of the circuit board.

Boutros et al does not disclose the housing is formed from a material having a thermal conductivity of at least approximately 0.27 W/m-K so as to conduct heat away

Art Unit: 2827

from circuitry of the circuit board. Pope et al teaches a housing (connector) comprising a material of Zenite (liquid crystal polymer) (see col. 57, lines 1-21) for conducting heat away from the circuit board. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the prior art of Boutros et al by using a material of Zenite (liquid crystal polymer) (which is inherently having the same thermal conductivity and *approximately* 0.27 W/m-K as the liquid crystal polymer of the invention) for making the connector housing as taught by Pope et al. One of ordinary skill in the art would have been motivated because using a liquid crystal polymer having a low thermal conductivity of 0.27 W/m-K as Zenite would provide a low thermal conductance for conducting heat away from the circuit board and also protecting the circuitry of the circuit board by not using high thermal conductivity material.

Furthermore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use a liquid crystal polymer material having a thermal conductivity of 0.27 W/m-K as Zenite for making the housing for providing a low thermal conductance, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As to claims 16 and 19, Boutros et al does not teach the material comprises a liquid crystal polymer. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the connector of Boutros et al by using a liquid crystal polymer material for the housing for providing a low thermal conductance in order to protect the circuit board, since it has been held to be within the

Art Unit: 2827

general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

7. Claims 17 and 20, are rejected under 35 U.S.C. 103(a) as being unpatentable over Boutros et al (U.S. 6,276,943) in view of Pope et al (U.S. 6,135,781) as applied above in claims 15, 18, 21-23 and 39 and further in view of Volz et al. (U.S. 5,353,191).

As to claims 17 and 20, Boutros et al discloses a connector and a corresponding method in figures 1-5, comprising: a slot connector/housing (1) having a slot (see element 14) to receive a circuit board (3); and an edge of the slot connector (1) to mount to another circuit board. Boutros et al and Pope et al do not teach the housing (connector) and a corresponding method comprising forming fins in the housing to conduct heat away from the circuit board; and forming the fins out of a liquid crystal polymer. Volz et al teaches a housing (10, Fig. 1) comprising fins (20) to promote conduction of heat away from the circuit board (see col. 3, line 60 – col. 4, line 16); and forming the fins out of a liquid crystal polymer. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the housing of Boutros et al and Pope et al by including fins as taught by Volz et al for the purpose of releasing heat from the circuit board.

8. Claims 21-24 and 39-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boutros et al (U.S. 6,276,943) in view of Volz et al (U.S. 5,353,191)

As to claims 21, 22, 24 and 39-40, Boutros et al discloses a connector and a corresponding method in figures 1-5, comprising: a slot connector/housing (1) having a



Art Unit: 2827

slot (see element 14) to receive a circuit board (3); and an edge of the slot connector (1) to mount to another circuit board. Boutros et al does not teach the housing (connector) and a corresponding method comprising forming fins in the housing to conduct heat away from the circuit board; and forming the fins out of a liquid crystal polymer. Volz et al teaches a housing (10, Fig. 1) comprising fins (20) to promote conduction of heat away from the circuit board (see col. 3, line 60 – col. 4, line 16); and forming the fins out of a liquid crystal polymer. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the housing of Boutros et al by including fins as taught by Volz et al for the purpose of releasing heat from the circuit board.

As to claim 23, Boutros et al, Pope et al, and Volz et al do not teach each of the clearances is in a range between approximately  $\frac{1}{4}$  inches and approximately  $\frac{3}{8}$  inches. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the circuit board of Boutros et al, Pope et al, and Volz et al by including each of the clearances is in a range between approximately  $\frac{1}{4}$  inches and approximately  $\frac{3}{8}$  inches. One of ordinary skill in the art would have been motivated because  $\frac{1}{4}$  inches and  $\frac{3}{8}$  inches rule are standard sizes and would be provided to fit/mate with the sizes of connector and circuit board, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

As to claim 41, Boutros et al discloses in figures 1-5 an apparatus, further comprising a retention mechanism (18) located partially inside the housing (1) to engage

Art Unit: 2827

the circuit board (3) to resist removal of the circuit board from a housing (1) (see Figs. 1-5, col. 4, line 24 - col. 6, line 7).

***Allowable Subject Matter***

9. Claims 1-5 and 42-43 are allowed.

10. The following is a statement of reasons for the indication of allowable subject matter: claim 1 recites, inter alia, "a circuit board comprising a substrate having electrical contacts to releasably mate with contact springs of a slot connector; wherein the electrical contacts comprising a first set of at least three uniformly spaced contacts to communicate power and a second set of at least three uniformly spaced contacts to communicate signals and not to communicate power, adjacent contacts of the first set are separated by a first distance and adjacent contacts of the second set are separated by a second distance different from the first distance; and wherein no intervening contact exists between any two adjacent contacts of the first set".

11. The art of record does not disclose the above limitations, nor would it be obvious to modify the art of record so as to include the above limitations.

***Response to Arguments***

12. Applicant's arguments with respect to claims 6, 8-30, 35-37, 39-41, and 44-48 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Pan et al (U.S. 6,017,248) discloses card edge connector.

Art Unit: 2827

Kurotori et al (U.S. 6,162,091) discloses a connector having hook parts engaged to notch parts of the printed circuit board.

Verhaegen (U.S. 2003/0152128) discloses device and method for thermal sensing.

Meng et al (U.S. 6,227,898) discloses card edge connector with removable rail guide.


***Contact information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Y. Tran whose telephone number is (571) 272-2110. The examiner can normally be reached on Monday through Thursday and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo, can be reached on (571) 272-1957. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3431.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TYT



Thanh Y. Tran